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PENSOFT

New records of *Macrobrachium* Spence Bate, 1868 (Decapoda, Palaemonidae) from the northern coast of Brazil

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Abstract
Among the species belonging to the genus *Macrobrachium* Spence Bate, 1868, *M. carcinus* (Linnaeus, 1758) and *M. olfersii* (Wiegmann, 1836) are geographically widespread in the western Atlantic from the Gulf Coast to southern Brazil. We describe the current geographic distribution of *M. carcinus* and *M. olfersii* and include records of these species in the state of Maranhão, Brazil.

Key words
Macrobrachium olfersii; *Macrobrachium carcinus*; shrimp; geographic distribution; new occurrences.

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Introduction

The genus *Macrobrachium* Spence Bate, 1868 belongs to the subfamily Palaemoninae, and with about 230 species, it is the most numerous genus of the subfamily Palaemonidae. There are 22 species known in Brazil (Melo 2003, Valencia and Campos 2007, Mantelatto et al. 2008, Loebmann et al. 2010, Maciel et al. 2011, Anger 2013, Dos Santos et al. 2013). To date, there are 4 known species of this genus in Maranhão, *M. acanthurus* (Wiegmann, 1836), *M. amazonicum* (Heller, 1862), *M. brasiliense* (Heller, 1862), and *M. jelskii* (Miers, 1877) (Melo 2003). Ramos-Porto et al. (1978) and Coelho and Ramos-Porto (1980) were the first authors to report freshwater shrimp, *M. acanthurus* and *M. amazonicum,* from the state. Herein, we provide the current geographic distribution of *M. carcinus* and *M. olfersii*, and include new records from northeastern Brazil.

Methods

Samples of *Macrobrachium* species were collected from 20 to 21 November 2014 in São José and Água Rica streams, in the municipalities of Paulino Neves and Tutóia, Maranhão state. These streams are part of the drainage basin of the Rio Preguiças and lie within the savanna biome (IBGE 2010, NUGEO/UEMA 2011).

Dip nets and sieves were used around the margins of the streams and in marginal vegetation for a 20-min period over a 150 m stretch. Collected specimens were fixed in a 10% formaldehyde solution and preserved in 70% alcohol. In the laboratory, specimens were identified by using taxonomic keys (Holthuis 1952, García-Dávila and Magalhães 2003, Melo 2003, Sampaio et al. 2009), measured, and sexed.

The specimens total length was measured (CT, mea-

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Figure 1. Lateral view of female *Macrobrachium olfersii* from Riacho Água Rica, Paulino Neves, Maranhão (scale bar: 14 mm).

Figure 2. Lateral view of male *Macrobrachium carcinus* from Riacho São José, Paulino Neves, Maranhão (scale bar: 36.5 mm).

surement from the tip of the rostrum to the tip of the telson). A representative lot of the collected specimens was deposited at the Zoology Didactic Collection of Garanhuns Campus, University of Pernambuco, under numbering CDZ 615 and CDZ 623.

Results

Family Palaemonidae Rafinesque, 1815
Genus *Macrobrachium* Bate, 1868

Macrobrachium olfersii (Wiegmann, 1836)
Figures 1, 3
Palaemon olfersii Wiegmann 1836: 150.

Collected and examined material. Brazil, Maranhão, Tutóia: Riacho Água Rica (02°46′04.3″ S, 042°28′04.0″ W), 19.X.2014, 13 females (15.12 to 41.93 mm CT), 18 males (17.96–55.48 mm); Brazil, Maranhão, Paulino Neves: Riacho São José (02°49′26.2″ S, 042°32′38.3″ W), 20.X.2014, 21 males (27.98–52.06 mm), 3 females (19.29–34.07 mm CT).

Geographic distribution. (Fig. 3; Table 1) United States, Central America, Colombia, Venezuela, Suriname, and Brazil (Pará, Piauí, Ceará, Rio Grande do Norte, Pernambuco, Alagoas, Sergipe, Bahia, Minas Gerais, Espírito Santo, Rio de Janeiro, São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul) (Melo 2003); new occurrence: Maranhão.

Observations. The size of male specimens was between 17.96 and 60.18 mm; females 15.12 and 41.93 mm (CT), weighing between 0.046 and 2.386 g for males and 0.0292 and 0,655 g for females.

Bowles et al. (2000) recorded the largest male 90 mm long and ovigerous females between 30 and 65 mm, whereas Ammar et al. (2001) found males from 20.10 to 93.0 mm, females ranging from 23 to 58.20 mm, and ovigerous females 21.20 to 60.0 mm. Mossolin and Bueno (2002) recorded smaller sizes than previous literature, at 57.0 mm for the largest female and 81.93 mm for the largest male. In this study, sizes were smaller than found by Bowles et al. (2000), Ammar et al. (2001), and Mossolin and Bueno (2002).

Macrobrachium olfersii are found in submerged vegetation along the river banks, and with either a rocky and sandy substrate (Ammar et al. 2001, Mossolin and Bueno 2002, Melo 2003). Samples of *M. olfersii* from this study

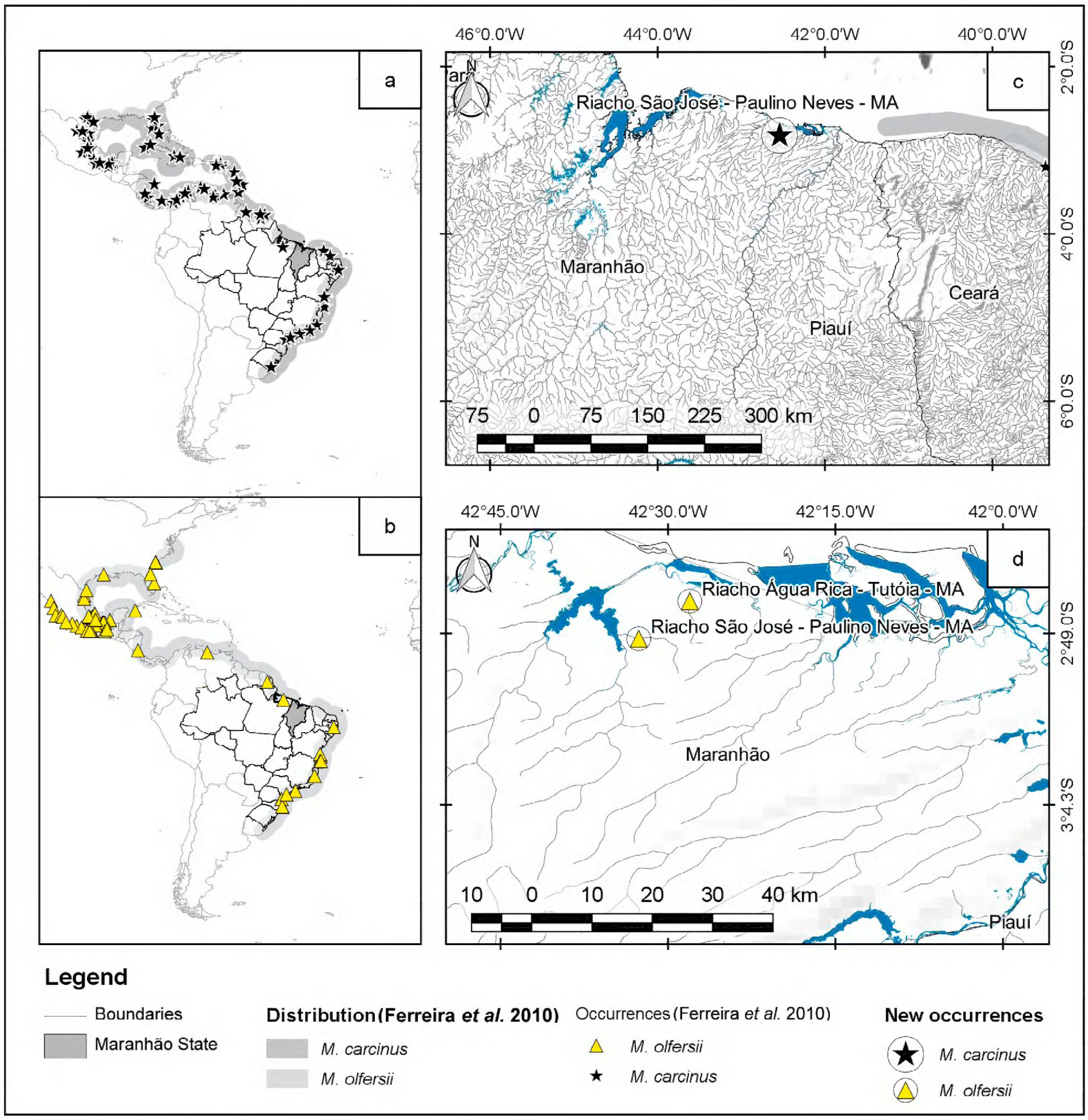

Figure 3. Geographic distribution of *M. carcinus* (Linnaeus, 1758) and *M. olfersii* (Wiegmann, 1836) in the Neotropical regional (Table 1). In image c, there is a new occurrence of *Macrobrachium carcinus* (star) and in image d, the new occurrence of *Macrobrachium olfersii* (yellow triangle).

were recorded in streams with marginal vegetation, sandy substrate, organic material and banks having leaves and roots.

Macrobrachium carcinus (Linnaeus, 1758)
Figures 2, 3
Cancer carcinus Linnaeus, 1758: 631.

Collected and examined material. Brazil, Maranhão, Paulino Neves: Riacho São José (02°49′26.2″ S, 042°32′38.3″ W), 20.X.2014, 1 male, 169.15 mm (CT).

Geographic distribution. (Fig. 3; Table 1) USA (Florida, Mississippi, and Texas) Mexico, Guatemala, Nicaragua, Costa Rica, Cuba, Porto Rico, Jamaica, Barbados, Lesser Antilles, Colombia, Venezuela, Guiana, Suriname, Ecuador, Peru, and Brazil (Pará, Pernambuco, Alagoas, Espírito Santo, Rio de Janeiro, São Paulo, Santa Catarina, Rio Grande do Sul, and Paraná) (Holthuis 1952, Bowles et al. 2000, Melo 2003, Sampaio et al. 2009); new occurrence: Maranhão.

Observations. This species occurs in the coastal basins and usually preferred pools with reduced water flow, occurring mainly in the middle to lower sections (Mejía-Ortiz 2001, Melo and Coelho 2008), although Mejía-Ortiz (2010) recorded species at altitudes varying from 1100 to 200 m. In this study, the species was records in streams with marginal vegetation, silt substrate, and organic material and roots.

Discussion

Freshwater shrimp are important biotic components of the ecosystem (Lima et al. 2014), acting as herbivores, scavengers, predators, or prey of other animals (Ligeiro et al. 2014). They have the capacity to mitigate effects of catfish on periphyton and sediments (Scott et al. 2012), possess the symbiotic cleaning function (Garrone-Neto et al. 2014) ,and they are bioindicators of aquatic contamination (Nazari et al. 2003).

Macrobrachium olfersii is a small crepuscular species with continuous reproduction (Ammar et al. 2001, Mossolin and Bueno 2002, Melo 2003). Mossolin and Bueno (2002) observed that the species prefers warm waters than the other species recorded in this study and are greater in numbers during months with higher temperatures. *Macrobrachium olfersii* shows high sexual dimorphism in the second pair of pereopods between the left and right, in terms of unequal size and robustness in males, while in females the pereopods are less robust and equal (Mossolin and Bueno 2003). Cheliped growth occurs gradually, a distinguishing factor in the juvenile to the adult phases, in addition to be the main characteristic for taxonomic identification (Melo 2003, Mossolin and Bueno 2003).

Popularly known as *pitu*, it is considered one of the largest of the freshwater shrimp on the east coast of the Americas (Lara and Wehrtmann 2009). *Macrobrachium carcinus* is included in the Red List of endangered invertebrate species in Brazil (Melo and Coelho 2008). The threats are mainly overfishing, habitat destruction, pollution, and construction of hydroelectric dams (Bowles 2000, Bauer 2011). Dams act as barriers that prevent the larvae of *M. olfersii* from migrating upstream in rivers. Planktonic marine larvae of this species are usually widespread because of currents (Bauer 2011), and the connectivity between marine and freshwater environments provide favorable conditions for reproduction. Therefore, disturbances in these habitats can affect species survival.

Fifty-five *M. olfersii,* but only 1 *M. carcinus,* were collected. This single collected specimen of *M. carcinus* is probably due to the difficulty in collecting this species in gill and dip nets, because cove traps are generally used for this shrimp (Rocha 2010). The number of freshwater shrimp species in the state of Maranhão is now increased from 4 to 6 species.

The freshwater crustaceans of the state of Maranhão are underestimated. A catalog of species is urgently needed to comprehend species diversity. In future research, information on collection methodology, including the type of traps, are needed in order to obtain a more effective qualitative and quantitative survey of the local crustacean fauna. Mantelatto et al. (2016) highlighted the need for new checklists and better knowledge of palaemonidean shrimp life histories.

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Authors' Contributions

JN collected the data, KA and MA identified the species, KA, MA and JN wrote the manuscript.

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Table 1. Geographic distribution of *Macrobrachium carcinus* (Linnaeus, 1758) and *M. olfersii* (Wiegmann, 1836) in the Neotropical region.

Species	Locality	State	Country	Latitude	Longitude
M. olfersii	Ilha Mosqueiro (Furo das Marinhas)	Pará	Brazil	01°10′19″ S	048°19′02″ W
M. olfersii		Espírito Santo	Brazil	20°03′40″ S	040°37′00″ W
M. olfersii		Bahia	Brazil	16°22′49″ S	039°03′14″ W
M. olfersii	St. Augustine area waters	Florida	USA	29°53′52″ S	081°18′35″ W
M. olfersii	Río Zimatán, carretera Salina Cruz-Huatulco	Oaxaca	Mexico	15°49′48″ S	096°00′00″ W
M. olfersii			French Guiana	3°12′04″ S	052°19′04″ W
M. olfersii	Gulf of Mexico, vicinity of Brownsville	Texas	USA	25°59′07″ S	097°07′24″ W
M. olfersii	Río Máquinas	Veracruz	Mexico	18°38′24″ S	094°52′48″ W
M. olfersii	Macayo 1a Sección, río Mezcalapa	Chiapas	Mexico	17°57′0″ S	093°12′00″ W
M. olfersii	Arroyo Agua de Perro	Guerrero	Mexico	17°05′24″ S	099°33′36″ W
M. olfersii	Laguna de Sontecomapan, río Coscoapan	Veracruz	Mexico	18°34′12″ S	094°55′48″ W
M. olfersii	Río Carrizal, Buenavista Río Nuevo, 3a sección	Tabasco	Mexico	17°56′24″ S	093°01′48″ W
M. olfersii	Río La Palma, Los Tuxtlas	Veracruz	Mexico	18°34′12″ S	094°55′12″ W
M. olfersii	Río Murga, a la altura del poblado de Murga, 17 km al Noreste de Petatlan	Guerrero	Mexico	17°41′24″ S	100°40′12″ W
M. olfersii	at the end of James Island Yacht Club pier		USA	32°45′20″ S	079°55′06″ W
M. olfersii	Río González	Tabasco	Mexico	18°32′24″ S	091°19′48″ W
M. olfersii	Macayo 1a Sección, río Mezcalapa	Chiapas	Mexico	17°57′0″ S	093°12′00″ W
M. olfersii	Río Ayutla, Morro Ayutla, carR Salina Cruz-Huatulco	Oaxaca	Mexico	15°54′36″ S	095°51′00″ W
M. olfersii	La Palma, Los Tuxtlas Ver	Veracruz	Mexico	18°33′36″ S	094°55′12″ W
M. olfersii	Río Coyula, cuenca baja, abajo del puente de la carretera Huatulco-Salina Cruz	Oaxaca	Mexico	15°48′36″ S	096°18′36″ W
M. olfersii	La Carbonera, San Fernando	Tamaulipas	Mexico	24°37′01″ S	097°43′19″ W
M. olfersii		Florida	USA	27°40′36″ S	080°23′20″ W
M. olfersii	Río Carrizal Platáno y cacao, 2a Sección	Tabasco	Mexico	17°58′12″ S	093°07′48″ W
M. olfersii	Río Zimatán, carretera Salina Cruz-Huatulco	Oaxaca	Mexico	15°49′48″ S	096°00′00″ W
M. olfersii	Río Máquinas	Veracruz	Mexico	18°38′24″ S	094°52′48″ W
M. olfersii	Antes de la descarga, Corregidora de Ortiz, 3a Sección, río Mezcalapa	Tabasco	Mexico	17°58′48″ S	092°55′48″ W
M. olfersii	Rio del Salmoral	Veracruz	Mexico	19°20′24″ S	096°20′24″ W
M. olfersii	Bajo el puente de Río Purificación, Jal. Carr. Melaque-Pto. Vallarta	Jalisco	Mexico	19°44′24″ S	103°22′12″ W
M. olfersii	Charleston Harbor, at James Island Yacht Club pier	South Carolina	USA	32°45′20″ S	079°55′06″ W
M. olfersii	Río de la Estación Biológica Los Tuxtlas	Veracruz	Mexico	18°36′36″ S	094°52′48″ W
M. olfersii	Puente Petatengo, cuenca alta del río Zimatán, tributario del río Zimatán	Oaxaca	Mexico	15°56′24″ S	096°01′48″ W

Continued

Table 1. *Continued.*

Species	Locality	State	Country	Latitude	Longitude
M. olfersii	Río Zimatán, carretera Salina Cruz-Huatulco	Oaxaca	Mexico	15°49′48″ S	096°00′00″ W
M. olfersii	Laguna de Sontecomapan, Los Tuxtlas	Veracruz	Mexico	18°31′12″ S	094°55′48″ W
M. olfersii	El Naranjo entre Tonalá y Pijijiapan	Chiapas	Mexico	15°43′12″ S	092°37′48″ W
M. olfersii	Río Tonalá	Tabasco	Mexico	17°52′12″ S	092°34′12″ W
M. olfersii	Presa José Ma Morelos "La Villita", límite entre Michoacán y Guerrero	Michoacán de Ocampo	Mexico	18°02′24″ S	102°10′48″ W
M. olfersii	Río Copalita, cuenca baja, abajo del puente de la carretera Huatulco-Salina Cruz	Oaxaca	Mexico	15°49′12″ S	096°03′36″ W
M. olfersii	Desembocadura del Río Jamapa	Veracruz	Mexico	19°05′28″ S	096°06′11″ W
M. olfersii	Río Zimatán, carretera Salina Cruz-Huatulco	Oaxaca	Mexico	15°49′48″ S	096°0′0″ W
M. olfersii	Río Papagayo, Gro.	Guerrero	Mexico	16°45′36″ S	098°19′48″ W
M. olfersii	Actopan	Veracruz	Mexico	19°30′00″ S	096°36′00″ W
M. olfersii	Río Colotepec	Oaxaca	Mexico	15°48′36″ S	097°00′36″ W
M. olfersii	Poblado de Castillo	Río San Juan	Nicaragua	11°00′36″ N	084°24′00″ W
M. olfersii	Río de la Estación Biológica Los Tuxtlas	Veracruz	Mexico	18°36′36″ S	094°52′48″ W
M. olfersii	Río Copalita, cuenca baja, abajo del puente de la carretera Huatulco-Salina Cruz	Oaxaca	Mexico	15°49′12″ S	096°18′36″ W
M. olfersii	Río González	Tabasco	Mexico	18°32′24″ S	091°19′48″ W
M. olfersii	Río Cuitzmala, Jalisco a 5 km del Puente de la carretera Melaque-Pto. Vallarta	Jalisco	Mexico	19°25′12″ S	103°0′0″ W
M. olfersii	Río Lagartero, cerca de Arriaga	Chiapas	Mexico	16°15′36″ S	092°04′12″ W
M. olfersii	Río Tonalá	Tabasco	Mexico	17°52′12″ S	092°34′12″ W
M. olfersii	Río Máquinas, Los Tuxtlas	Veracruz	Mexico	18°38′24″ S	094°52′48″ W
M. olfersii	Rio Chichiriviche	Distrito Federal	Venezuela	10°32′27″ S	067°14′22″ W
M. olfersii	Río Ayutla, Morro Ayutla, carr Salina Cruz-Huatulco	Oaxaca	Mexico	15°54′36″ S	095°51′00″ W
M. olfersii	Ashley River	South Carolina	USA	32°50′52″ S	080°02′32″ W
M. olfersii	Río entre La Palma y Río Basura, Los Tuxtlas	Veracruz	Mexico	18°33′36″ S	094°55′12″ W
M. olfersii	Ashley River, just below railroad bridge near Charleston	South Carolina	USA	32°50′52″ S	080°02′32″ W
M. olfersii	Arroyo Colorado	Sinaloa	Mexico	23°19′12″ S	105°56′24″ W
M. olfersii	Río saliendo de Pto. Escondido	Oaxaca	Mexico	15°51′00″ S	097°03′00″ W
M. olfersii	Arroyo el Zapote entre Tuxtepec y Palomares	Oaxaca	Mexico	17°10′12″ S	094°52′12″ W
M. olfersii	Mermentau River (RM 16.7) and Little Pecan Bayou confluence	Louisiana	USA	29°47′45″ S	092°52′14″ W
M. olfersii	Río Zimatán, carretera Salina Cruz-Huatulco	Oaxaca	Mexico	15°49′48″ S	096°00′00″ W
M. olfersii	El estanque, La Tovara	Nayarit	Mexico	21°31′48″ S	105°15′00″ W
M. olfersii	Río Coscoapan, Laguna de Sontecomapan	Veracruz	Mexico	18°34′12″ S	094°55′48″ W
M. olfersii	Río Máquinas	Veracruz	Mexico	18°38′24″ S	094°52′48″ W
M. olfersii	Río Zimatán, Huatulco	Oaxaca	Mexico	15°49′48″ S	096°00′00″ W
M. olfersii	Río Máquinas	Veracruz	Mexico	18°38′24″ S	094°52′48″ W
M. olfersii	20 km S.SE de Martínez de la Torre	Veracruz	Mexico	20°06′36″ S	095°04′12″ W
M. olfersii	19 km S.SE de Martínez de la Torre	Veracruz	Mexico	20°06′36″ S	095°04′12″ W
M. olfersii	Antes de la descarga, corregidora de Ortiz, 3a Sección, Río Mezcalapa	Tabasco	Mexico	17°58′48″ S	092°55′48″ W
M. olfersii		Bahia	Brazil	15°13′07″ S	039°03′57″ W
M. olfersii		Bahia	Bahia	14°47′32″ S	039°11′32″ W
M. olfersii		Bahia	Bahia	14°38′46″ S	039°14′53″ W
M. olfersii	Playa Paraíso, Puerto Morelos	Quintana Roo	Mexico	20°53′24″ S	085°04′12″ W
M. olfersii				16°23′23″ S	039°15′48″ W
M. olfersii	Río San Nicolás, 5 km río arriba del puente de la carretera Melaque-Pto. Vallarta, Mpio. Huerta, Jalisco	Jalisco	Mexico	19°39′36″ S	104°46′48″ W
M. olfersii	Río Máquinas rumbo a Montepio	Veracruz	Mexico	18°38′24″ S	094°52′48″ W
M. olfersii	Río Carrizal Platáno y cacao, 2a Sección	Tabasco	Mexico	17°58′12″ S	093°07′48″ W
M. olfersii		Paraná	Brazil	25°48′51″ S	048°48′57″ W
M. olfersii		Paraná	Brazil	25°49′40″ S	048°47′24″ W
M. olfersii		Santa Catarina	Brazil	27°44′32″ S	048°31′49″ W
M. olfersii	Río Chachalacas	Veracruz	Mexico	19°27′36″ S	095°39′00″ W
M. olfersii		Santa Catarina	Brazil	27°38′47″ S	048°37′10″ W
M. olfersii	La Pesca, Soto La Marina	Tamaulipas	Mexico	23°46′37″ S	097°44′20″ W
M. olfersii		Pernambuco	Brazil	07°58′32″ S	035°51′20″ W
M. olfersii		São Paulo	Brazil	23°46′35″ S	045°21′05″ W
M. olfersii	Río Carrizal, Corregidora de Ortíz, 5a Sección	Tabasco	Mexico	17°57′00″ S	093°07′12″ W
M. olfersii				24°39′41″ S	047°34′13″ W
M. olfersii		Santa Catarina	Brazil	27°45′S	048°32″W

Continued

Table 1. *Continued.*

Species	Locality	State	Country	Latitude	Longitude
M. olfersii		Santa Catarina	Brazil	27°28′S	048°30′W
M. olfersii	Oeste da Praia do Jabaquara	São Paulo	Brazil	23°44′12.6″ S	045°17′38.9″W
M. olfersii	Estrada da Praia do Jabaquara	São Paulo	Brazil	23°44′12.3″ S	045°18′19.4″W
M. olfersii	Ponta das Canas	São Paulo	Brazil	23°43′42.8″ S	045°20′28.0″W
M. olfersii	Praia da Armação	São Paulo	Brazil	23°44′13.7″ S	045°20′36.2″W
M. olfersii	Alto da Praia do Sino	São Paulo	Brazil	23°45′01.3″ S	045°20′41.4″W
M. olfersii	Alto da Praia da Siriúba	São Paulo	Brazil	23°45′25.2″ S	045°20′34.5″W
M. olfersii	Praia do Viana	São Paulo	Brazil	23°45′38.4″ S	045°20′54.8″W
M. olfersii	Praia do Itaquanduba	São Paulo	Brazil	23°47′45.5″ S	045°21′50.8″W
M. olfersii	Alto do Cocaia	São Paulo	Brazil	23°48′35.4″ S	045°21′10.8″W
M. olfersii	Cocaia	São Paulo	Brazil	23°49′01.7″ S	045°21′10.8″W
M. olfersii	Baixo da Cachoeira da Toca	São Paulo	Brazil	23°49′31.8″ S	045°20′56.6″W
M. olfersii	Meio do Rio da Água Branca	São Paulo	Brazil	23°49′23.2″ S	045°21′47.9″W
M. olfersii	Cachoeira da Toca	São Paulo	Brazil	23°49′34.8″ S	045°20′30.3″W
M. olfersii	Cachoeira da Zabumba	São Paulo	Brazil	23°50′08.1″ S	045°22′09.1″W
M. olfersii	Tesouro da Colina	São Paulo	Brazil	23°50′19.9″ S	045°22′25.0″W
M. olfersii	Ilhote	São Paulo	Brazil	23°50′20.4″ S	045°23′55.1″W
M. olfersii	Praia do Portinho	São Paulo	Brazil	23°50′42.8″ S	045°24′15.6″W
M. olfersii	Campo do Portinho	São Paulo	Brazil	23°50′53.6″ S	045°24′16.3″W
M. olfersii	Cachoeira Pancada D'Água	São Paulo	Brazil	23°51′12.0″ S	045°24′25.8″W
M. olfersii	Cachoeira dos Três Tombos	São Paulo	Brazil	23°51′17.6″ S	045°24′19.1″W
M. olfersii	Norte da Praia Grande	São Paulo	Brazil	23°51′23.0″ S	045°24′47.0″W
M. olfersii	Sul da Praia Grande	São Paulo	Brazil	23°51′34.5″ S	045°25′03.5″W
M. olfersii	Norte da Praia do Curral	São Paulo	Brazil	23°51′49.0″ S	045°25′40.7″W
M. olfersii	Alto da Praia do Curral	São Paulo	Brazil	23°52′05.3″ S	045°25′30.9″W
M. olfersii	Praia do Veloso	São Paulo	Brazil	23°52′15.1″ S	045°26′07.3″W
M. olfersii	Camping do Veloso	São Paulo	Brazil	23°52′32.2″ S	045°26′09.7″W
M. olfersii	Cambaraú	São Paulo	Brazil	23°52′31.9″ S	045°26′35.0″W
M. olfersii	Rodamonte/Taubaté	São Paulo	Brazil	23°53′55.4″ S	045°27′31.8″W
M. olfersii	Mexilhão	São Paulo	Brazil	23°54′20.8″ S	045°27′26.3″W
M. olfersii	Borrifos	São Paulo	Brazil	23°55′16.0″ S	045°27′03.5″W
M. olfersii	Porto dos Frades	São Paulo	Brazil	23°55′44.6″ S	045°26′33.5″W
M. olfersii	Cachoeira da Vista	São Paulo	Brazil	23°55′54.9″ S	045°26′26.0″W
M. olfersii	Marambaia	São Paulo	Brazil	23°56′04.0″ S	045°25′51.9″W
M. olfersii	Praia do Gato / Poço do Gordo	São Paulo	Brazil	23°50′40.6″ S	045°17′04.0″W
M. olfersii	Castelhanos/Cachoeira do Engenho	São Paulo	Brazil	23°51′03.2″ S	045°17′22.6″W
M. olfersii	Praia Mansa	São Paulo	Brazil	23°52′07.8″ S	045°17′28.1″W
M. olfersii	Praia Vermelha	São Paulo	Brazil	23°52′24.8″ S	045°17′29.4″W
M. olfersii	Cachoeira da Laje	São Paulo	Brazil	23°55′55.2″ S	045°24′32.7″W
M. olfersii	Engenho D`Água I	São Paulo	Brazil	23°47′40.8″ S	045°21′29.3″W
M. olfersii	Taubaté	São Paulo	Brazil	23°54′02.5″ S	045°27′28.0″W
M. olfersii	Sul da Praia do Curral	São Paulo	Brazil	23°52′07.6″ S	045°25′56.5″W
M. olfersii	Canal da Lagoa do Peri	Santa Catarina	Brazil	27°43′30″ S	048°32′18″W
M. olfersii	Parque Municipal da Lagoa do Peri	Santa Catarina	Brazil	27°43′S	048°32′W
M. olfersii	Guaratuba	Paraná	Brazil	48°43′45.8″S	025°49′55.6″W
M. olfersii	Guaratuba	Paraná	Brazil	48°43′57.0″ S	025°49′78.6″W
M. olfersii	Guaratuba	Paraná	Brazil	48°43′66.0″S	025°50′03.2″W
M. olfersii	Guaratuba	Paraná	Brazil	48°44′65.3″S	025°48′99.7″W
M. olfersii	Guaratuba	Paraná	Brazil	48°44′33.4″S	025°47′91.0″W
M. olfersii	Guaratuba	Paraná	Brazil	48°44′33.9″ S	025°48′52.6″W
M. olfersii	Área de ecoturismo	Espírito Santo	Brazil	20°05′21.6″S	040°33′28.0″W
M. olfersii		Espírito Santo	Brazil	20°05′27.4″S	040°33′05.6″W
M. olfersii		Espírito Santo	Brazil	20°05′24.7″S	040°32′59.8″W
M. olfersii	Comunidade ribeirinha	Espírito Santo	Brazil	20°05′27.4″S	040°33′05.6″W
M. olfersii	Bacia do Ribeira de Iguape, município de Pariquera-Açu, rio Pariquera-Açu	São Paulo	Brazil	24°37′37″S	047°44′43″W
M. olfersii	Bacia do Ribeira de Iguape, município de Pariquera-Açu, rio Pariquera-Mirim	São Paulo	Brazil	24°23′09″S	047°01′07″W
M. olfersii	Bacia do Ribeira de Iguape, município de Pariquera-Açu, Cachoeira do Paraíso	São Paulo	Brazil	24°23′49″S	047°07′17″W

Continued

Table 1. *Continued.*

Species	Locality	State	Country	Latitude	Longitude
M. olfersii	Bacia do Ribeira de Iguape, município de Pariquera-Açu, Trilha do Fundão	São Paulo	Brazil	24°23′14″S	47°01′02″W
M. olfersii	Bacia do Ribeira de Iguape, município de Cananéia, rio Branco	São Paulo	Brazil	24°54′36″S	47°59′52″W
M. olfersii	Bacia do Ribeira de Iguape, município de Ilha Comprida, córrego sem nome	São Paulo	Brazil	25°00′50″S	47°52′32″W
M. olfersii	Bacia do Ribeira de Iguape, município de Pariquera-Açu, rio Capivarú	São Paulo	Brazil	25°00′05″	47°51′53″W
M. olfersii	Bacia do Ribeira de Iguape, Parque Estadual da Ilha do Cardoso, cachoeira do rio Pedro Luiz	São Paulo	Brazil	25°00′50″S	47°52′31″W
M. olfersii	Estação Ecológica Juréia-Itatins	São Paulo	Brazil	24°22′05″S	47°03′17″W
M. olfersii	Estaçaõ ecológica Juréia -Itatins	São Paulo	Brazil	24°23′09″S	47°01′07″W
M. olfersii	Rio Pascagoula		Brazil	30°31′N	88° 36′W
M. olfersii	Rio Burunhém, cerca de 8km ao sul de Vera Cruz, na Estrada Eunápolis	Bahia	Brazil	16°25′28′S	39°21′W
M. olfersii	Rio Juaçuí (afluente do Rio Doce), sob ponte da Estrada BR-116 em Frei Inocêncio	Minas Gerais	Brazil	18°34′21′S	41°54′42″W
M. olfersii	Rio Jucuruçu (costeiro), numa fazendo acima do município de Itamaraju	Bahia	Brazil	17°01′10″S	39°39′57″W
M. olfersii	Rio Cachoeira Ilhéus	Bahia	Brazil	14°48′05.18″S	39°09′54.49″W
M. olfersii	Cachoeira River, Ilhéus	Bahia	Brazil	14°48′10.33″S	39°10′03.65″W
M. olfersii	Cachoeira River, Ilhéus	Bahia	Brazil	14°47′31.6″S	39°11′07.8″W
M. olfersii	River Santana, Ilhéus	Bahia	Brazil	14°51′16.8″S	39°05′58.6″W
M. olfersii	Rio Acuípe	Bahia	Brazil	15°04′40″S	39°01′40″W
M. olfersii	Lagoa Encantada, Ilhéus	Bahia	Brazil	14°37′20.8″S	39°08′32.5″W
M. olfersii	Lagoa Encantada, Ilhéus	Bahia	Brazil	14°37′20.8″S	39°08′32.5″W
M. olfersii	Santana River, Povoado Rio do Engenho, Ilhéus	Bahia	Brazil	14°51′07.4″S	39°04′12.8″W
M. olfersii	Acuípe River, Ilhéus	Bahia	Brazil	15°04′40″S	39°01′40″W
M. olfersii	Lagoa Encantada, Ilhéus	Bahia	Brazil	14°37′20.8″S	39°08′32.5″W
M. olfersii	Santana River, Fazenda Theobroma,Ilhéus	Bahia	Brazil	14°50′58.2″S	39°04′52.7″W
M. olfersii	Small stream, Estação Experimental da CEPLAC	Bahia	Brazil	15°17′02.3″S	39°05′21.5″W
M. olfersii	River Una	Bahia	Brazil	15°17′28.1″S	39°06′09.5″W
M. olfersii	Tijuipinho River, Uruçuca	Bahia	Brazil	14°26′39.7″S	39°03′13.2″W
M. olfersii	Almada River, Ilhéus	Bahia	Brazil	14°39′09.6″S;	39°04′58.7″W
M. carcinus	Río Pánuco en Tampico	Tamaulipas	Mexico	22°12′43″ N	97°05′28″ W
M. carcinus	Aldama	Tamaulipas	Mexico	22°55′23″ N	98°04′55″ W
M. carcinus			Cuba	20°00′25″ N	75°00′38″ W
M. carcinus	Presa Marte R. Gómez, Camargo	Tamaulipas	Mexico	26°14′10″ N	98°55′41″ W
M. carcinus			Colombia	9°24′0″ N	75°49′00″ W
M. carcinus			USA	29°14′46″ N	81°38′37″ W
M. carcinus	Río Bravo en Matamoros	Campeche	Mexico	25°53′06″ N	97°31′01″ W
M. carcinus	La Pesca, Soto La Marina	Tamaulipas	Mexico	23°46′37″ N	97°44′20″ W
M. carcinus	Quebrada Rebolledo, a la salida de Chuspa	Miranda	Venezuela	10°36′43″ N	66°18′46″ W
M. carcinus	Río Agualeguas	Nuevo leon	Mexico	26°31′58″ N	100°34′58″ W
M. carcinus		Florida	USA	27°09′43″ N	81°54′06″ W
M. carcinus		Florida	USA	29°59′39″ N	81°40′33″ W
M. carcinus	Upper San Marcos River, San Marcos, near headwaters of San Marcos River, campus of Texas State University	Texas	USA	29°53′21″ N	97°56′20″ W
M. carcinus	Los Tuxtlas	Veracruz	Mexico	18°36′36″ N	94°54′0″ W
M. carcinus	Upper San Marcos River, San Marcos, near headwaters of San Marcos River, campus of Texas State University	Texas	USA	29°53′21″ N	97°56′20″ W
M. carcinus	Rio Sonodoro, Rio Sonodoro		Puerto Rico	18°19′32″ N	65°49′13″ W
M. carcinus	Upper San Marcos River, San Marcos, near headwaters of San Marcos River, campus of Texas State University	Texas	USA	29°53′21″ N	97°56′20″ W
M. carcinus	Cd. Mier.	Tamaulipas	Mexico	26°25′48″ N	99°08′42″ W
M. carcinus	Upper San Marcos River, San Marcos, near headwaters of San Marcos River, campus of Texas State University	Texas	USA	29°53′21″ N	097°56′20″ W
M. carcinus			Virgin Islands, U.S.	18°22′01″ N	064°57′49″ W
M. carcinus			Venezuela	10°36′05″ N	066°53′52″ W
M. carcinus	Río Samaria, Cumuapan, 1a sección	Tabasco	Mexico	18°00′36″ N	093°04′12″ W
M. carcinus	La Pesca, Soto La Marina	Tamaulipas	Mexico	23°46′37″ N	097°44′20″ W
M. carcinus	Río Tamesí en Tampico	Tamaulipas	Mexico	22°13′48″ N	097°08′56″ W
M. carcinus	Río Jacal Blanco, Cd. Mier	Tamaulipas	Mexico	26°25′48″ N	099°08′42″ W

Continued

Table 1. *Continued.*

Species	Locality	State	Country	Latitude	Longitude
M. carcinus			Puerto Rico	17°58′04″ N	066°03′42″ W
M. carcinus	Río de la Estación Biológica Los Tuxtlas	Veracruz	Mexico	18°36′36″ N	094°52′48″ W
M. carcinus			Costa Rica	09°58′43″ N	083°02′05″ W
M. carcinus	Río Pánuco en Tampico	Tamaulipas	Mexico	22°12′43″ N	097°05′28″ W
M. carcinus		Vera Cruz	Mexico	18°26′56″ N	095°12′57″ W
M. carcinus	Ciénaga	Bolívar	Colombia	10°23′05″ N	075°23′52″ W
M. carcinus			Venezuela	10°49′00″ N	064°10′59″ W
M. carcinus	Arroyo Blanco	Querétaro Arteaga	Mexico	21°10′48″ N	099°19′12″ W
M. carcinus		Castries	Saint Lucia	14°00′00″ N	061°0′0″ W
M. carcinus	Rio Pánuco	Tamaulipas	Mexico	22°12′56″ N	097°55′19″ W
M. carcinus			Puerto Rico	18°03′16″ N	066°30′25″ W
M. carcinus			Brazil	22°55′00″ S	042°49′00″ W
M. carcinus	San Antonio	Texas	USA	29°28′22″ N	098°28′23″ W
M. carcinus			Brazil	24°09′00″ S	046°48′0″ W
M. carcinus			Mexico	18°17′39″ N	092°39′15″ W
M. carcinus	Presa cerro de oro	Oaxaca	Mexico	18°01′12″ N	096°14′24″ W
M. carcinus	Río Pánuco en Tampico	Tamaulipas	Mexico	22°12′43″ N	097°05′28″ W
M. carcinus	La Pesca, Soto La Marina	Tamaulipas	Mexico	23°46′37″ N	097°44′20″ W
M. carcinus			Puerto Rico	18°14′10″ N	066°02′56″ W
M. carcinus			French Guiana	5°45′00″ N	053°58′00″ W
M. carcinus			Mexico	17°32′21″ N	092°48′29″ W
M. carcinus	Laguna de Chila, Pánuco	Veracruz	Mexico	22°10′48″ N	098°07′30″ W
M. carcinus			Colombia	10°05′09″ N	074°50′48″ W
M. carcinus	Río Pánuco en Tampico	Tamaulipas	Mexico	22°12′43″ N	097°05′28″ W
M. carcinus	Río de la Estación Biológica Los Tuxtlas	Veracruz	Mexico	18°36′36″ N	094°52′48″ W
M. carcinus	Veracruz	Veracruz	Mexico	19°12′36″ N	095°49′48″ W
M. carcinus	Río Máquinas, carretera Los Tuxtlas-Monte Pío	Veracruz	Mexico	18°36′36″ N	095°09′36″ W
M. carcinus	Río Máquinas, Los Tuxtlas	Veracruz	Mexico	18°38′24″ N	094°52′48″ W
M. carcinus	Río Máquinas	Veracruz	Mexico	18°38′24″ N	094°52′48″ W
M. carcinus	Río Pánuco en Tampico	Tamaulipas	Mexico	22°12′43″ N	097°05′28″ W
M. carcinus	Río de la Estación Biológica Los Tuxtlas	Veracruz	Mexico	18°36′36″ N	094°52′48″ W
M. carcinus	Río Espiritu Santo, 1st pool area from Stream House trail		Puerto Rico	18°20′31″ N	065°49′32″ W
M. carcinus			Cuba	20°16′59″ N	076°28′00″ W
M. carcinus	Mameyes River, Mameyes (last riffle before estuary) across from Westin Rio Mar golf course		Puerto Rico	18°22′28″ N	065°45′44″ W
M. carcinus			Colombia	11°15′00″ N	073°46′00″ W
M. carcinus	Mameyes River, Mameyes (last riffle before estuary) across from Westin Rio Mar golf course		Puerto Rico	18°22′28″ N	065°45′44″ W
M. carcinus	Mameyes River, furthest upstream [of Patrick Cooney's 2009 sites] on the Mameyes		Puerto Rico	18°19′41″ N	065°45′11″ W
M. carcinus	Rio Tocantins, em Cametá	Pará	Brazil	2°14′44″ S	049°29′34″ W
M. carcinus	Mameyes River, further upstream [from PRS12] on Mameyes		Puerto Rico	18°21′22″ N	065°46′06″ W
M. carcinus			Brazil	23°03′21″ S	043°33′51″ W
M. carcinus	Mameyes River, further upstream [from PRS12] on Mameyes		Puerto Rico	18°21′22″ N	065°46′06″ W
M. carcinus			Brazil	17°07′00″ S	039°13′00″ W
M. carcinus	Mameyes River, Mameyes (last riffle before estuary) across from Westin Rio Mar golf course		Puerto Rico	18°22′28″ N	065°45′44″ W
M. carcinus	Mameyes River, Mameyes (last riffle before estuary) across from Westin Rio Mar golf course		Puerto Rico	18°22′28″ N	65°45′44″ W
M. carcinus			Mexico	18°46′52″ N	95°45′26″ W
M. carcinus	Mameyes River, further upstream [from PRS12] on Mameyes		Puerto Rico	18°21′22″ N	65°46′06″ W
M. carcinus			Brazil	21°37′00″ S	41°03′0″ W
M. carcinus	Mameyes River, Mameyes (last riffle before estuary) across from Westin Rio Mar golf course		Puerto Rico	18°22′28″ N	65°45′44″ W
M. carcinus			Guadeloupe	16°17′33″ N	61°31′56″ W
M. carcinus	Río arriba de Coatzacoalcos	Veracruz	Mexico	17°58′48″ N	94°33′0″ W
M. carcinus	Mameyes River, Mameyes (last riffle before estuary) across from Westin Rio Mar golf course		Puerto Rico	18°22′28″ N	65°45′44″ W
M. carcinus			USA	30°14′56″ N	97°43′01″ W
M. carcinus	Mameyes River, 2nd furthest upstream [of Patrick Cooney's 2009 sites on Mameyes]		Puerto Rico	18°20′41″ N	65°45′24″ W

Continued

Table 1. *Continued.*

Species	Locality	State	Country	Latitude	Longitude
M. carcinus	Río Espiritu Santo, 1st pool area from Stream House trail		Puerto Rico	18°20′31″N	65°49′32″W
M. carcinus	Río Cazones, Ejido Flores Magón, Cazones	Veracruz	Mexico	20°42′32″N	97°18′43″W
M. carcinus	Mameyes River, Mameyes (last riffle before estuary) across from Westin Rio Mar golf course		Puerto Rico	18°22′28″N	65°45′44″W
M. carcinus	Mameyes River, 2nd furthest upstream [of Patrick Cooney's 2009 sites on Mameyes]		Puerto Rico	18°20′41″N	65°45′24″W
M. carcinus	Mameyes River, 2nd furthest upstream [of Patrick Cooney's 2009 sites on Mameyes]		Puerto Rico	18°20′41″N	65°45′24″W
M. carcinus	Rio Tocantins, em Cametá	Pará	Brazil	02°14′44″S	49°29′34″W
M. carcinus	Mameyes River, 2nd furthest upstream [of Patrick Cooney's 2009 sites on Mameyes]		Puerto Rico	18°20′41″N	65°45′24″W
M. carcinus	Los Tuxtlas	Veracruz	Mexico	18°36′36″N	94°52′48″W
M. carcinus		Ceará	Brazil	03°12′00″S	39°22′00″W
M. carcinus		Florida	USA	27°49′12″N	80°30′28″W
M. carcinus			Puerto Rico	18°22′21″N	66°11′17″W
M. carcinus			Venezuela	10°36′00″N	66°55′59″W
M. carcinus	Río de la Estación Biológica Los Tuxtlas	Veracruz	Mexico	18°36′36″N	94°52′48″W
M. carcinus	La Pesca, Soto La Marina	Tamaulipas	Mexico	23°46′37″N	97°44′20″W
M. carcinus			Venezuela	10°07′18″N	66°46′18″W
M. carcinus	Rio Jaguaribe	Ceará	Brazil	04°27′53″S	37°47′31″W
M. carcinus			Colombia	13°21′00″N	81°22′00″W
M. carcinus	La Pesca, Soto La Marina	Tamaulipas	Mexico	23°46′37″N	97°44′20″W
M. carcinus			Panama	9°13′45″N	79°32′10″W
M. carcinus			Virgin Is., U.S.	17°42′53″N	64°42′31″W
M. carcinus	Río entre La Palma y Río Basura, Los Tuxtlas	Veracruz	Mexico	18°33′36″N	94°55′12″W
M. carcinus		Brokopondo	Suriname	4°45′00″N	55°0′0″W
M. carcinus		Bathsheba	Barbados	13°12′56″N	59°31′41″W
M. carcinus			Mexico	17°51′00″N	93°22′59″W
M. carcinus	Doctor's River, near Speyville, in small dammed pond	Trinidad	Trinidad and Tobago	11°18′00″N	60°31′48″W
M. carcinus			Mexico	18°22′00″N	95°48′0″W
M. carcinus	Río Samaría, en la descarga	Tabasco	Mexico	17°49′12″N	93°21′36″W
M. carcinus	Río Sonadora, Rio Sonodoro		Puerto Rico	18°19′32″N	65°49′13″W
M. carcinus	Trinidad, Doctor's River, near Speyside, dammed up pond (n. coll.) pond		Trinidad and Tobago	11°18′00″N	60°31′48″W
M. carcinus	Camino a la Laguna Escondida, Estación de Biología Tropical Los Tuxtlas	Veracruz	Mexico	18°34′48″N	95°03′36″W
M. carcinus	Río González	Tabasco	Mexico	18°32′24″N	91°19′48″W
M. carcinus	Río Carrizal Platáno y cacao, 2a Sección	Tabasco	Mexico	17°58′12″N	93°01′12″W
M. carcinus	Coxcoapan Restaurant Sontecomapan	Veracruz	Mexico	18°27′36″N	94°51′0″W
M. carcinus	Río Pánuco en Tampico	Tamaulipas	Mexico	22°12′43″N	97°05′28″W
M. carcinus	Miami	Florida	USA	25°46′12″N	80°11′13″W
M. carcinus	Río Pánuco en Tampico	Tamaulipas	Mexico	22°12′43″N	97°05′28″W
M. carcinus	El Mezquite, Matamoros	Tamaulipas	Mexico	25°14′35″N	97°25′23″W
M. carcinus		Hidalgo	Mexico	21°07′40″N	98°52′28″W
M. carcinus	Dique Jiménez, Jiménez	Tamaulipas	Mexico	24°12′18″N	98°29′06″W
M. carcinus	Coxcoapan	Veracruz	Mexico	18°27′36″N	94°51′0″W
M. carcinus	Punta de Tlacotalpan	Veracruz	Mexico	18°37′12″N	94°19′12″W
M. carcinus	San Marcos River	Texas	USA	29°52′36″N	97°56′24″W
M. carcinus	Río Pánuco en Tampico	Tamaulipas	Mexico	22°12′43″N	97°05′28″W
M. carcinus	Punta de Piedra, San Fernando	Tamaulipas	Mexico	24°29′28″N	97°44′31″W
M. carcinus	Coxcoapan Restaurant Sontecomapan	Veracruz	Mexico	18°27′36″N	94°51′0″W
M. carcinus	La Palma, Los Tuxtlas	Veracruz	Mexico	18°33′36″N	94°55′12″W
M. carcinus			Colombia	11°30′57″N	72°58′10″W
M. carcinus	Rio Suriname		Suriname	05°49′19″N	55°08′58″W
M. carcinus			Guiana	06°22′59″N	58°40′59″W
M. carcinus	Desembocadura del Río Coatzacoalcos, Coatzacoalcos	Veracruz	Mexico	18°07′12″N	94°25′19″W
M. carcinus	Río Blanco, Moctezuma, Landa de Matamorros	Querétaro Arteaga	Mexico	21°10′48″N	99°19′12″W
M. carcinus			Curaçao	12°10′08″N	68°59′27″W
M. carcinus			Colombia	11°01′00″N	73°46′59″W

Continued

Table 1. *Continued.*

Species	Locality	State	Country	Latitude	Longitude
M. carcinus	Landa de Matamoros	Querétaro Arteaga	Mexico	21°14′24″N	98°52′48″W
M. carcinus	Axtla	San Luis Potosí	Mexico	21°17′24″N	97°10′48″W
M. carcinus	Río Pánuco en Pánuco	Veracruz	Mexico	22°03′29″N	98°10′37″W
M. carcinus	Veracruz	Veracruz	Mexico	19°12′36″N	95°49′48″W
M. carcinus	Escurrimiento al lado del río Pedregal	Tabasco	Mexico	17°52′12″N	92°34′12″W
M. carcinus	Playa Lauro Villar, Matamoros	Tamaulipas	Mexico	25°49′19″N	97°09′07″W
M. carcinus		Bahia	Brazil	15°13′05″S	39°03′57″W
M. carcinus	Río Pánuco en Pánuco	Veracruz	Mexico	22°03′29″N	98°10′37″W
M. carcinus		Bahia	Brazil	14°47′23″S	39°11′36″W
M. carcinus		Bahia	Brazil	14°38′48″S	39°14′58″W
M. carcinus		Paraná	Brazil	25°13′41″S	48°45′22″W
M. carcinus	Laguna La Playuela		Nicaragua	10°55′00″N	83°42′0″W
M. carcinus			Cuba	22°19′00″N	83°45′0″W
M. carcinus	Escollera de Tuxpan, Tuxpan	Veracruz	Mexico	20°57′04″N	97°25′16″W
M. carcinus			Aruba	12°29′45″N	69°55′44″W
M. carcinus		Pernambuco	Brazil	07°56′22″S	35°44′21″W
M. carcinus	Parque Estadual Ilha Bela	São Paulo	Brazil	23°51′22″S	45°24′30″W
M. carcinus		Vera Cruz	Mexico	19°24′41″N	96°21′14″W
M. carcinus	Parque Estadual Ilha Bela	São Paulo	Brazil	23°50′31″S	45°23′04″W
M. carcinus	Rio Ribeira do Iguape	São Paulo	Brazil	24°41′14″S	47°37′44″W
M. carcinus			Colombia	08°43′40″N	76°36′17″W
M. carcinus	Vaes Bay	Texas	USA	28°44′14″N	96°25′59″W
M. carcinus	Havana		Cuba	23°05′58″N	82°20′38″W
M. carcinus	Canal São Gonçalo	Rio Grande do Sul	Brazil	32°00′57″S	52°25′09″W
M. carcinus		Florida	USA	29°52′08″N	81°18′23″W
M. carcinus			Panama	09°09′47″N	79°50′17″W
M. carcinus	Sabancuy, Cd. del Carmen	Campeche	Mexico	18°37′55″N	91°50′06″W
M. carcinus		Texas	USA	29°51′33″N	97°54′49″W
M. carcinus	Matagorda Bay	Texas	USA	28°45′47″N	96°08′57″W
M. carcinus	Rio Sonodoro, Rio Sonodoro		Puerto Rico	18°19′32″N	65°49′13″W
M. carcinus	Escollera de Tuxpan, Tuxpan	Veracruz	Mexico	20°57′04″N	97°25′16″W
M. carcinus	Oeste da Praia do Jabaquara	São Paulo	Brazil	23°44′12.6″S	45°17′38.9″W
M. carcinus	Estrada da Praia do Jabaquara	São Paulo	Brazil	23°44′12.3″S	45°18′19.4″W
M. carcinus	Alto da Praia da Siriúba	São Paulo	Brazil	23°45′25.2″S	45°20′34.5″W
M. carcinus	Praia do Viana	São Paulo	Brazil	23°45′38.4″S	45°20′54.8″W
M. carcinus	Praia do Itaquanduba	São Paulo	Brazil	23°47′45.5″S	45°21′50.8″W
M. carcinus	Rio da Toca	São Paulo	Brazil	23°49′08.3″S	45°21′22.0″W
M. carcinus	Tesouro da Colina	São Paulo	Brazil	23°50′19.9″S	45°22′25.0″W
M. carcinus	Campo do Portinho	São Paulo	Brazil	23°50′53.6″S	45°24′16.3″W
M. carcinus	Porto dos Frades	São Paulo	Brazil	23°55′44.6″S	45°26′33.5″W
M. carcinus	Marambaia	São Paulo	Brazil	23°56′04.0″S	45°25′51.9″W
M. carcinus	Praia Mansa	São Paulo	Brazil	23°52′07.8″S	45°17′28.1″W
M. carcinus	Cachoeira da Laje	São Paulo	Brazil	23°55′55.2″S	45°24′32.7″W
M. carcinus	Bacia do Ribeira de Iguape, município de Cananéia, rio Branco	São Paulo	Brazil	24°54′36″S	47°59′52″W
M. carcinus	Bacia da Baixada Santista, município de Peruíbe, Estação Ecológica Juréia-Itatins, rio Perequê	São Paulo	Brazil	24°22′27″S	47°04′03″W
M. carcinus	Estação Ecológica Juréia-Itatins - rio sem nome	São Paulo	Brazil	24°23′09″S	047°01′07″W
M. carcinus	Estação Ecológica Juréia-Itatins: Trilha do Fundão	São Paulo	Brazil	24°23′14″S	047°01′02″W
M. carcinus		São Paulo	Brazil	00°03′40.9″S	051°08′46.6″W
M. carcinus			Brazil	00°15′39.9″S	051°20′42.3″W
M. carcinus	Estação Ecológica Juréia-Itatins	São Paulo	Brazil	24°23′05″S	047°01′08″W
M. carcinus	Ilha de Arapiranga	Pará	Brazil	01°19′S	048°33′W
M. carcinus	Rio Pascagoula, near Bay St. Louis (Rotten Bayou), Hancock County	Mississippi	USA	30°31′N	088°36′W
M. carcinus	Rio Capibaribe-Mirim	Pernambuco	Brazil	07°42′S	035°33′W
M. carcinus	Rio Pinheira, um pequeno rio no continente, cerca de 3 milhas ao sul da ponta sul da Ilha de Santa Catarina	Santa Catarina	Brazil	27°00′00″S	50°00′00″W
M. carcinus	Rio San Juan		Nicaragua	11°11′N	84°46′W
M. carcinus		São Paulo	Brazil	23°32′12″S	045°03′55″W

Continued

Table 1. *Continued.*

Species	Locality	State	Country	Latitude	Longitude
M. carcinus	Rio da Praia do Sambaqui	Santa Catarina	Brazil	27°28′36″ S	048°32′00″ W
M. carcinus		Santa Catarina	Brazil	27°40′51.1″ S	048°33′42.6″ W
M. carcinus	Ribeirão da Ilha, Florianópolis	Santa Catarina	Brazil	27°42′11″ S	048°33′00″ W
M. carcinus		Santa Catarina	Brazil	27°25′08.3″ S	048°35′47.4″ W
M. carcinus	Rio Cachoeira, Ilhéus	Bahia	Brazil	14°48′05.18″S	039°09′54.49″W
M. carcinus	Rio Contas, distrito de Taboquinhas, Itacaré	Bahia	Brazil	14°20′S	039°10′W
M. carcinus	Pequeno riacho, Serra Grande, Uruçuca	Bahia	Brazil	14°27′S	039°01′W
M. carcinus	Rio Santana, Povoado Rio do Engenho, Ilhéus	Bahia	Brazil	14°51′07.4″S	039°04′12.8″W
M. carcinus	Rio Santana	Bahia	Brazil	14°51′16.8″S	039°05′58.6″W